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PCT Application No. PCT/US96/12255, filed July 24, 1996, having International Publication No. WO 97/04449; and

PCT Application No. PCT/US95/09553, filed July 28, 1995, having International Publication No. WO 96/03641.--

IN THE CLAIMS:

Please cancel claims 3, 5, 7, 12-13, 17, 19, 24-25, 28, 30, 32, and 37-38, as well as the claim that was improperly designated as claim 14a. Claims 1, 2, 4, 6, 8-11, 14-16, 18, 20-23, 26-27, 29, 31, 33-36, 39-43, and 46-49 have been amended. A clean version of the amended claims follows.

The changed claims (together with the unchanged claims) are shown at the back of this version under the heading "Version with Markings to Show Changes made."

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1. (Amended) In a scanning probe microscope and/or nanomachining system in which scanning probe techniques are a subset of functionality, the system including a probe and/or tool positioned relative to a sample volume and having relative motion between the probe and the sample volume in the X,Y and Z space and controlled and sensed in any direction with respect to the sample volume or any element thereof and producing data responsive to any element or property of said volume, a method for accurately measuring a parameter of that volume or performing a task related to that volume including the following steps:

providing a first scan by the probe and/or tool of the target volume in X, Y and Z or any element thereof to produce data representative of the volumetric element of target,

storing the data representative of the volume, any parametric representation, and/or simultaneous parametric representation and/or any element of that volume,

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providing, optionally, a second operation based on the information previously obtained,

measuring a portion or all of the volume or any other parameter associated with the target volume or making any change to said volume.

2. (Amended) The method of claim 1 wherein the first scan produces volume data by at least one of an atomic force measurement and a tunneling current measurement, a scanning electron beam probe measurement, and a scanning ion beam probe measurement.

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4. (Amended) The method of claim 1 wherein the first scan produces volume data by a scanning electron beam probe measurement or a scanning ion beam probe measurement.

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6. (Amended) The method of claim 4 wherein the first scan simultaneously produces electromagnetic data or secondary particle data.

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8. (Amended) The method of claim 1 where the second scan produces volume data by a magnetic force, and/or field and/or gradient measurement.

9. (Amended) The method of claim 1 wherein the first scan produces volume data by an electric field measurement.

10. (Amended) The method of claim 1 wherein the second scan is used to modify the volume in any measurable manner.

11. (Amended) The method of claim 10 wherein the modification is accomplished by at least one of (a) the probe mechanically cutting the volume of the sample, (b) applying an electric field between the probe and the volume of the sample, and (c) applying a particle beam of ions or electrons between the probe and the volume of the sample.

14. (Amended) In a scanning probe microscope and/or nanomachining system in which scanning probe techniques are a subset of functionality, the system including a probe and/or tool positioned relative to a sample volume or topography and having relative motion between the probe and the sample volume or topography in the X,Y and Z space and controlled and sensed in any direction with respect to the sample volume or topography or any element thereof and producing data responsive to any element or property of said volume or topography, a method for accurately measuring a parameter of that volume or topography or performing a task related to that volume or topography including the following steps:

providing a first scan by the probe and/or tool of regions around the target volume or topography in X, Y and Z or any element thereof to produce data representative of the bounding volumetric or topographic elements of the target(s) volume or topography,

storing the data representative of the bounding volume or topography, any parametric representation, and/or simultaneous parametric representation and/or any element of that volume or topography,

providing, optionally, a second operation based on the information previously obtained,

measuring a portion or all of the volume or topography or any other parameter associated with the target volume or topography or making any change to said volume or topography.

15. (Amended) The method of claim 14 wherein the first scan produces volume or topographic data by at least one of an atomic force measurement and a tunneling current measurement.

16. (Amended) The method of claim 14 wherein the first scan produces volume or topographic data by a scanning electron beam probe measurement or a scanning ion beam probe measurement.

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18. (Amended) The method of claim 16 wherein the first scan simultaneously produces electromagnetic data or secondary particle data.

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20. (Amended) The method of claim 14 where the second scan produces volume or topographic data by a magnetic force, and/or field and/or gradient measurement.

21. (Amended) The method of claim 14 wherein the first scan produces volume or topographic data by an electric field measurement.

22. (Amended) The method of claim 14 wherein the second scan is used to modify the volume in any measurable manner.

23. (Amended) The method of claim 22 wherein the modification is accomplished by at least one of (a) the probe mechanically cutting the volume of the sample, (b) applying an electric field between the probe and the volume of the sample, and (c) applying a particle beam of ions or electrons between the probe and the volume of the sample.

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26. (Amended) In a scanning probe microscope and/or nanomachining system in which scanning probe techniques are a subset of functionality, the system including a probe and/or tool positioned relative to a sample volume or topography and having relative motion between the probe and the sample volume or topography in the X,Y and Z space and controlled and sensed in any direction with respect to the sample volume or topography or any element thereof and producing data responsive to any element or property of said volume or topography, a method for accurately measuring a parameter of that volume or topography or performing a task related to that volume or topography including the following steps:

providing a first location by the probe and/or tool of regions around/on or within the target volume or topography in X, Y and Z or any element thereof to locate the volumetric or topographic elements of a starting reference point or points the target(s)

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volume or topography, without storing the data representative of the bounding volume or topography, any parametric representation, and/or simultaneous parametric representation and/or any element of that volume or topography,

measuring a portion or all of the volume or topography or any other parameter associated with the target volume or topography or making any change to said volume or topography.

27. (Amended) The method of claim 26 wherein the first scan produces volume data by at least one of an atomic force measurement and a tunneling current measurement, a scanning electron beam probe measurement, and a scanning ion beam probe measurement.

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29. (Amended) The method of claim 26 wherein the first scan produces volume data by a scanning electron beam probe measurement or a scanning ion beam probe measurement.

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31. (Amended) The method of claim 29 wherein the first scan simultaneously produces electromagnetic data or secondary particle data.

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33. (Amended) The method of claim 26 where the second scan produces volume data by a magnetic force, and/or field and/or gradient measurement.

34. (Amended) The method of claim 26 wherein the first scan produces volume data by an electric field measurement.

35. (Amended) The method of claim 26 wherein the second scan is used to modify the volume in any measurable manner.

36. (Amended) The method of claim 34 wherein the modification is accomplished by at least one of (a) the probe mechanically cutting the volume of the sample, (b) applying an electric field between the probe and the volume of the sample,

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and (c) applying a particle beam of ions or electrons between the probe and the volume of the sample.

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39. (Amended) An illumination system for an opaque or optically limited or blocked stage in which illumination is introduced along one or more edges of the sample and is arranged so reflecting elements cause the illumination to be propagated across the sample.

40. (Amended) The illumination system of claim 39 in which the intensity of the illumination introduced into the sample is a function of the position of the stage with respect to the optical observing means.

41. (Amended) An illumination system for an opaque or optically limited or blocked stage in which illumination is introduced along one or more sides of the sample, striking the sample at a glancing angle just under the optical observing means.

42. (Amended) The illumination system of claim 41 in which the source means is fixed to always point at the glancing area below a fixed optical observing means.

43. (Amended) The illumination system of claim 41 in which the source means is moved to always point at the glancing area below a movable optical observing means

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46. (Amended) A nanomachining system as described herein in which the tip or tool is stopped from any SPM induced vibration and is moved until a measurable change in any related sensing system indicates that the tip of the tool is in contact with the target volume.

47. (Amended) A nanomachining system as described herein in which the tip or tool is not stopped from any SPM induced vibration but is restricted in its

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normal motion (associated with measurement) so as to follow the loci of a target nanomachining step to nanomachine a particular feature or features in the target volume.

48. (Amended) A nanomachining system as described herein in which the tip or tool is not stopped from any SPM induced vibration but is restricted in its normal motion (associated with measurement) so as to follow the loci of a target nanomachining step to nanomachine a particular feature or features in the target volume and the means for monitoring the tip or tool for measurement is used to determine when the tip or tool is no longer cutting the target volume.

49. (Amended) A nanomachining system as described herein in which the tip or tool is not stopped from any SPM induced vibration but is restricted in its normal motion (associated with measurement) so as to follow the loci of a target nanomachining step to nanomachine a particular feature or features in the target volume and the means for monitoring the tip or tool for measurement is used to determine when the tip or tool is no longer cutting the target volume.

REMARKS

Claims 1, 2, 4, 6, 8-11, 14-16, 18, 20-23, 26-27, 29, 31, 33-36, 39-49 are pending in the application.

The amendment to the claims makes a number of typographical corrections and consolidates a number of dependent claims.

The amendment to the specification (a) provides the priority claim to PCT Application No. PCT/US00/18041, filed June 30, 2000, and Provisional Application 60/142,178, filed July 1, 1999; and (b) removes the priority claim to the long list of earlier PCT and U.S. applications and patents while leaving intact the incorporation by reference of those earlier filed applications and patents.

No new matter is introduced, and the intent is not to change the scope of the claims.